ART. XVIII.—*A Monograph on the Pathology and the Rational Treatment of Infantile Laryngo-Tracheitis or Croup.* By E. R. PEASLEE, A. M., M. D., Prof. of Anatomy, etc. From the American Medical Monthly. 8vo. pp. 32. New York, 1854.

THIS is a very able monograph. The pathological views advanced in it, when carefully and candidly examined, will, we are persuaded, be found to be, in the main, correct. They coincide, certainly, with all the facts deduced from recent observations, and divest one of the most important diseases incident to childhood of the mystery in which its true character has so generally been supposed to be involved, by indicating its analogies with other morbid conditions occurring both in the infant and the adult. Croup is an affection which has, unquestionably, nothing specific in its nature. It is simply a laryngo-tracheitis, and, as such, stands in close relationship to, or, rather, is identical with, this form of inflammation, whether it occur in the adult or infant—whether it run its course, favourably or unfavourably, with or without the production of a false membrane. Croup consists essentially in an inflammation of the mucous membrane of the larynx, extending, in most cases, into the trachea, and often into the bronchi likewise. The false membrane, when it does occur, as well as the spasmodic symptoms—the laryngismus—are both merely accessory symptoms, and altogether dependent upon and secondary to the inflamed condition of the laryngeal and tracheal mucous tissue, which alone constitutes the disease. We saw, during the last year, a number of cases of acute laryngitis, occurring chiefly in young persons, in which no false membrane was formed; and yet, in their general symptoms, these cases could not be distinguished from attacks of what has been termed genuine croup.

The source from which the false membranes are in all cases derived, and the manner in which they are developed are thus, and we believe correctly, explained by Dr. Peaslee.

"A false membrane is, in all cases, formed from the *plasma of the blood*, and which consists principally of its fibrin. It was remarked, several years ago, by Dr. Alison, that there is, in all inflammations, a *tendency* to the exudation of plasma from the vessels of the inflamed part. We maintain that in all inflammations an exudation actually does occur. It is, however, sufficient for our present purpose, that the plasma is exuded from the engorged vessels of the part, and upon the surface, in all cases of inflammation of membranes, at least. Nobody doubts this assertion in regard to serous membranes; and even the purulent discharge (often called a secretion) from an inflamed mucous membrane, is known to be derived from the plasma exuded, by a degeneration of the exudation-corpuscles into pus cells. Moreover, if an actual false membrane forms in croup upon the mucous surface, it is equally derived from the same source.

"1. The first step towards the formation of a false membrane in croup, therefore, is the exudation of plasma upon the surface of the mucous membrane, as explained, in consequence of the laryngitis. The amount of the exudation will depend upon several circumstances; of which, the state of the blood, the extent of the inflammation, and the vascularity of the part, are the most important. In membranous croup, the exudation is most abundant, and, therefore, the resulting membrane is thickest, on the surface where the mucous follicles are most abundant; and this, in the trachea, is the case with the posterior wall. The follicles are merely an *inversion* of the mucous membrane; so that here is a great amount of free surface, and a vast number of small blood-vessels inclosed within a very small space. In other parts the surface is much more smooth, the vascularity less, and thus the exudation, as well as the resulting membrane, is thinner. It has already been asserted, that it is not the secretion of these follicles that becomes organized, nor is the exudation 'albuminous.'

"2. The second step in the development of a false membrane is the organization of the exuded plasma. But it is very well known that, in the majority of instances, this never takes place, even on serous membranes; and, therefore, no false membrane is formed.

"In fact three entirely different results may ensue to the layer of plasma exuded upon the free surface of a membrane in consequence of inflammation; provided it is allowed to remain in contact with it.

"1st. It may be entirely reabsorbed. 2d. It may be converted into pus; exudation-corpuscles being formed in it, and these becoming, subsequently, degenerated into pus cells. 3d. It may become fibrillated—coagulated—and thus form a false membrane; which, subsequently, may become more highly organized, and, in case of serous membranes, even vascular, at last.

"Now, either of these results is possible, in case of inflammation of both serous and mucous membranes. In case of the latter, however, the part affected may be so situated as to be brought into contact with foreign substances—as is the case with the mouth, pharynx, and other parts of the alimentary canal—and the exudation may thus become at once detached; and in that case, neither of the three results above mentioned can ensue. Moreover, the opportunities for reabsorption on mucous membranes are very slight indeed, and often null.

"To illustrate these results in case of a serous membrane: In *pleurisy* the exudation being reabsorbed, perfect recovery takes place; if it becomes organized, false membranes and adhesions are the result; or if it is converted into pus, empyema is the result.

"Now, the circumstances favourable to the organization of the plasma are: 1st. Its perfect contact with the living tissues; 2d. Perfect rest of the part, or maintaining the required contact, and for the necessary time also; 3d. Smoothness of surface, as also subservient to the first condition.

"On the other hand, the following circumstances are unfavourable to organization: 1st. Motion of the part affected; 2d. Contact of foreign substances; 3d. Irregularity of surface. But there are certain other conditions of the exudation itself, also, which affect the result. The former is more liable to become organized, and the membrane is more perfectly formed, in proportion—1st. To the amount of fibrin contained in it; 2d. to the slowness—amount of time allowed—of the fibrillation.

"Here we should, however, remark, that all the formative processes are in much less time completed in the young than in the adult animal; and it is in accordance with this ultimate fact, that Jurine and other experimenters could artificially produce false membranes in the air-passages of young animals alone. In adult animals, the exudation would become detached before its organization was complete.

"Now, if we compare the probabilities that an exudation upon a serous membrane will become organized with those that the same result will occur upon a mucous membrane, we find the former allows—1st. Of a far more perfect contact; since it is smooth, and comparatively or entirely at rest—for example, remark the immobility of the ribs in respiration, in pleurisy. 2d. It excludes the exudation from the air and from foreign substances. 3d. Allows time for the perfection of the process of organization. 4. The fact, also, that contact of the exuded plasma with the living tissues occurs on both its surfaces at the same time—being between the two layers of the serous membrane—must not be omitted here. Nor, 5, must we fail to add, that in case of inflammations of serous membranes, the blood, and therefore, probably, the exudation also, contains a greater amount of fibrin than exists in it in inflammations of mucous membranes.

"Mucous membranes, on the other hand, are opposed to the serous, in all the respects just mentioned. 1. Having a conoidal instead of a delicate, scaly epithelium in most parts—for example, over the whole respiratory passages, and the alimentary canal, from the cardiac orifice of the stomach to the sigmoid flexure—they do not allow of so perfect a contact of the plasma with the living tissue of the membrane itself. 2. They afford contact only on one side of the plasma. 3. In most parts, the plasma is exposed to the air and the con-

tact of foreign substances. 4. There is more motion of the part. 5. All these circumstances afford less time for the organization to occur; so that it may fail of being completed if commenced. 6. And, finally, the plasma itself is less organizable than in the case of inflammation of serous membranes.

"We have no difficulty, then, in accounting for the fact that false membranes occur very much more frequently on serous than on mucous membranes. Nor is there any in accounting for the fact that, in certain cases, they are formed in the latter also, as well as in the former.

"False membranes have been known to form in cases of inflammation of the rectum, the vagina, the uterus, the nasal passages, the pharynx, larynx, trachea and bronchial tubes; and in all these parts certain peculiarities exist, more favourable to the organization of the plasma than the mucous membrane in other parts presents. The rectum and vagina have a scaly epithelium, and are comparatively at rest—the rectum, even, being void of fæces and of motion, except during the act of defecation. The uterus, also, allows of still greater rest of the exuded plasma, though it has a conoidal epithelium. The whole extent of the air-passages is provided with a conoidal and a ciliated epithelium; but it has no foreign body in contact with it, except the air; and in this respect, and in point of motion of the surface, has the advantage of the alimentary canal above the rectum; where false membranes do not become organized. In children, however, there is less motion still; and they also requiring less time, we should expect organization to occur more frequently in them than in adults."

Instead of the foregoing long extract from the monograph of Dr. Peaslee, we might have contented ourselves by giving, in a brief synopsis, the leading views embraced in it. But, as the presence of a false membrane in cases of croup appears to have been the chief stumbling-block in the way of arriving at a correct understanding of the true pathology of the disease—while upon it has been attempted to be based the evidence of the specific character of the malady, we were desirous of presenting at length, and in his own words, the author's exposition of the source and mode of development of false membranes as a result, under certain circumstances, of simple inflammation of the tissues upon which such membranes occur.

Returning to the subject more immediately under consideration—the pathology of croup—Dr. Peaslee remarks:—

"In cases of actual laryngitis with false membrane, or membranous croup in children, the exuded plasma becomes to some extent organized, *fibrillated* at least. But can we suppose that this result occurs in every case of laryngitis in the early years of life? If the plasma is often absorbed, and also frequently converted into pus, in case of inflammation of a serous membrane, as in pleurisy, can we doubt that either or both these results often occur in cases of inflammation of any and of all mucous membranes? And to say that croup is a peculiar or *specific* inflammation, in order to account for the formation of the false membrane, would, for the sake of consistency, compel us also to invoke a *special* inflammation in those cases of pleurisy in which adhesions occur, while a *common* inflammation will answer if recovery occurs by absorption, or if empyema ensues. Our ideas, then, of the pathology of croup, so far as the answer to the first inquiry has established them, are these:—

"1st. An inflammation of the larynx, extending into the trachea, occurs; offering in its essential nature nothing different from any other case of inflammation of the same parts, either in the infant or the adult. It is generally preceded, in both infants and adults, by congestion and irritation, and therefore by catarrh.

"2d. An exudation of plasma occurs on the inflamed surface, as in the adult, this being most abundant in the trachea on the posterior wall, for reasons already given.

"3d. This exudation may be disposed of, in at least two ways, provided it is not at once removed, as it generally is, in adults but not in infants, by coughing; reabsorption probably very seldom occurring in this disease, though it is not impossible. *a.* It may become degenerated into pus—purulent matter—and thus, of course, at once be detached, which is the most common result.

b. It may become organized into a false membrane. This is more probable if the blood is rich in fibrin, as in a plethoric child; if there is but little cough, an adult generally expelling it thus; and if time is allowed for its development, less being required in the child than in the adult.

"4th. Croup is, therefore, merely a laryngo-tracheitis in infants and children, and offers nothing essentially different from the same inflammation in adults. The exudation in case of adults is, however, usually at once ejected by coughing, or in the form of purulent matter; while the liability to its organization in infants is greater; though, after all, a comparatively rare result, considering the whole number of cases, for the reasons before mentioned.

"5th. Practically, therefore, as well as pathologically, we cannot say with Bouchat, '*without a false membrane, croup does not exist.*' This membrane never exists till the inflammation—the essential element of the disease, as we believe—has preceded, and has produced the exudation of plasma, as before shown. No sooner does the catarrhal *irritation* merge into inflammation, than the plastic lymph is thrown out; and this *inflammation and its accompanying exudation* are the elements always present in croup.

"We, therefore, need not, for any practical purpose, admit an 'inflammatory and membranous' croup, as some writers have done, any more than we should make the same distinction in regard to pleuritis or peritonitis. All *croup is inflammatory*, at any rate; and a few cases are also accompanied by the formation of a false membrane. But the latter should not affect the treatment of the disease as an inflammation, but merely from its mechanical effects, and cannot be predicated in any case till it is actually seen; and this is not possible in most cases in which it is developed at the very onset of the disease. Finally, we would drop the term croup entirely, and use the term laryngo-tracheitis instead. In a work on the diseases of children, we would call particular attention to the fact that a false membrane is formed in about one-sixth of all the cases of this disease; while in adults, this is of very rare occurrence. But we would not make an accident the distinguishing feature of this disease, any more than we do in the case of others, nor allow it to enter into either our name or our definition of it.

"As in all other inflammations, so in this; the distinction of 'sthenic' and 'asthenic' is important, both in a pathological and a therapeutical point of view. So far, also, as laryngismus enters into any particular case—and it does into all cases of true laryngitis to some extent—the case is, of course, *spasmodic;* but this term must not be applied to the exclusion of the idea of inflammation. *Genuine spasmodic* croup, we have already seen, is a mere laryngismus. There is more or less spasm in all cases of bronchitis, and still more in whooping-cough; in the latter case in the larynx also; so that infantile laryngitis does not present any peculiarity in this respect."

In regard to the question: Does laryngitis and tracheitis, with false membrane, occur as well in the adult, as in early life? Dr. Peaslee says:—

"We do not hesitate to answer this question in the affirmative, having seen such membranes ourselves, and having demonstrated their fibrillated structure under the microscope. Such cases are comparatively rare, for the reasons already assigned; and therefore occur more frequently in females who are not accustomed, or, as in some instances, not able, to expectorate at all. I received and still retain such a membrane, expelled in a tubular form by an adult female patient of Dr. G. W. Garland, now of Lawrence, Mass. Even 'membranous croup,' then, if we retain the term, occurs, though rarely, in adults, it being, at all ages, essentially the same disease so far as its pathology is concerned."

To the question: Does the danger to the patient, in infantile laryngo-tracheitis with false membrane, result almost entirely from the presence of the membrane, as seems to be generally admitted, or is the inflammation alone often sufficient to produce death? Dr. Peaslee answers, that—

"Surely no reason can be assigned why a disease so fatal to adults as laryngitis and tracheitis should not be equally so in early life. And yet, since the disease of the 'Father of our country' to the present time, adults have died without the formation of a false membrane, in almost all instances, so far as can be ascertained.

"The fact cannot be overlooked, that an inflammation of the larynx is a serious and a dangerous matter, at any time of life, as a *mere inflammation*, aside from the final disposal of the exuded plasma. The treatment is, therefore, to be directed primarily to the disease as a mere inflammation. Of course, the formation of the membrane brings a new danger to the patient, since it partially, and, if it extends to the bronchial divisions in the lungs, in some parts completely, closes the air-passages, and thus produces a gradual asphyxia. Occurring, as it does, also, after the patient is reduced by the previous inflammation, its dangerous effects are increased. But we must, however, bear in mind the fact that the membrane is not organized till the *inflammation has subsided* in the part. The inflamed vessels relieve themselves by the exudation, and thus the inflammatory process is arrested. The treatment, therefore, to subdue inflammation, so proper at first, is *not* proper after the false membrane is formed in the larynx and trachea. We have here a *consequence* of inflammation to treat, in a part which the inflammation itself has left. The thicker the membrane, the greater the danger and amount of asphyxia; but the small trachea of an infant being closed in a greater ratio by it than the larger tube of the adult, the danger is comparatively slight in the latter from its formation. It is seldom more than one and a half lines thick at the thickest part, in the child; and usually one-half to one only.

"The progress of laryngo-tracheitis," Dr. P. remarks, "is invariably from above downwards; the observations of the best pathologists have established this point. Generally, or at least very frequently, a catarrh commences in the nasal passages, and extends backwards into the pharynx; then descending into the larynx, continues such for a time, or at once merges into an inflammation. Often the pharynx becomes inflamed, and a false membrane appears upon it before the inflammation descends into the larynx and trachea. In some cases the larynx may be the part first affected; but if so, such cases are to be regarded as exceptional, and the inflammation never extends upwards, but always downwards from that organ. The existence, therefore, of a catarrh for two or three days, and especially of a false membrane on the pharynx, before the peculiar ringing cough of infantile laryngitis occurs, are more important elements of diagnosis in this disease, though their absence is not *demonstrative* of its non-existence. It will be recollected, therefore, that we said the exudation of plasma relieves the inflammation of *the part*, though at the same time it may be extending downwards to other parts lower in the air-passages.

"In infantile laryngitis it has been stated that its progress is downwards into the trachea. In some cases, and not unfrequently, it extends into the bronchi, and even into their subdivisions into the lungs. The exudation is sometimes so copious in the smaller tubes in the lungs, that they become filled with a solid cylinder of plasma, instead of being lined with a false membrane. The same often occurs in cases of bronchitis in adults. We can have no warrant that this result will not occur in any case where a false membrane has been formed; nor that convalescence will commence at once, though large portions of it have been expelled from the trachea. Nor can we expect the convalescence to progress rapidly as soon as the laryngismus and ringing cough have ceased, since the bronchitis may still remain for a few days, or may even prove fatal at last.

"Some seem to think that, if the false membrane is removed from the larynx and trachea, all danger is over. Nothing, however, is gained by merely passing the air through the *air-passages;* it must enter the *air-cells* before the blood is aërated thereby. Whether, therefore, the trachea is diminished to one-half its capacity by a false membrane; or one-half of the smallest bronchial tubes are completely closed by solid cylinders of plasma, will not make the least difference so far as the production of asphyxia is concerned.

"The false membrane is often formed in a very short time after the exudation is poured out; but it is an important fact that a false membrane formed on a mucous surface never becomes vascular, and therefore permanent, as it may on a serous membrane; but it *soon becomes detached, and spontaneously falls off.* This is well-known to be the case in vaginitis, and the endo-metritis which sometimes accompanies dysmenorrhœa; and the disease now under consideration

is not at all different from these in this respect. Only a fibrillation existing in the false membrane, and, therefore, no vascular connection between it and the subjacent surface, it soon loses its slight vitality, and is cast off accordingly.

"The time elapsing before the spontaneous detachment of a false membrane varies in different cases, but seldom exceeds five or six days after its formation. But this result will surely occur if the patient's strength continues, and his life is sufficiently prolonged to afford the necessary time.

"It has been seen that laryngo-tracheitis occurs in the adult as well as in the infant; but is not the 'Diphtherite' of M. Bretonneau a different disease?

"We see no necessity," says Dr. P., "for any such admission. In diphtherite the false membrane almost always covers the pharynx and tonsils, and often extends into the posterior nares, covering both surfaces of the velum, and then descends into the larynx and trachea. The same often occurs also in connection with scarlatina and rubeola. But all this also often occurs in the young child, and therefore the terms 'Diphtherite,' or 'Croup of Adults,' we consider objectionable, as calculated to foster the idea of a radical difference as to the nature of inflammation of the larynx and trachea in the young child and the adult, while they are pathologically the same."

Although, from a careful perusal of the foregoing extracts from the monograph before us—for the copiousness of which we hardly think we need apologize, considering the importance of the subject to which they refer—our readers will acquire a very correct idea of the views of Dr. Peaslee in reference to the pathology of croup; nevertheless, the following recapitulation of the more prominent of those views will not, we are persuaded, be unacceptable:—

"1. Croup is always a laryngo-tracheitis, or inflammation, not of a specific kind, of the mucous membrane of the larynx, extending thence into the trachea also at least.

"2. Like other inflammations, it may be either sthenic or asthenic.

"3. Its progress is always downwards in the air-passages, whether it commences in the larynx, or, as is more frequently the case, higher up.

"4. It is always attended by an exudation of plasma upon the surface of the inflamed membrane.

"5. The inflammation subsides in the part on the occurrence of exudation.

"6. The plasma *remains* on the surface—it being usually detached and removed in case of the adult by coughing—it may, *a.* Become reabsorbed, which is a rare result; or, *b.* Become converted into purulent matter, and then excreted; or, *c.* Become organized into a false membrane. This last result is far more common in early life than in adults, though then occurring only in about one-sixth of all the cases. Consequently it can never be predicted, at the commencement of the disease, whether a false membrane will, or will not, be formed.

"7. If a false membrane is formed, it will become spontaneously detached, if the patient's life is sufficiently prolonged. Its removal, however, in whatever way effected, does not *insure* recovery.

"8. Laryngismus is associated, to some extent, with true laryngo-tracheitis, as a matter of course.

"9. Catarrh generally precedes laryngo-tracheitis. But the catarrhal discharge, *so called*, during the more advanced periods of this disease, is the purulent fluid formed by the degeneration of the exuded plasma.

"10. Diphtherite, or the 'croup of adults,' differs not *pathologically* from infantile laryngo-tracheitis. Generally, however, it is an asthenic form of laryngo-tracheitis, since it usually attacks persons already debilitated by other diseases."

It is impossible for us to follow the author of the monograph before us in his discussion of the rational treatment of infantile laryngo-tracheitis directly based, as he supposes, upon a correct pathology of the disease. The treatment he recommends, and, in general, the means upon which he would depend for carrying out his general indications, have our hearty approval. In some few particulars—in the comparative value of this or that remedy—and the stage of the disease to which it is best adapted—we may differ from him; but, in its general outlines, his therapeutical directions are sound and judicious. A general abstract of them would be of little value—to be properly appreciated they must be studied

in extenso, in connection with the comments with which the author has accompanied them.

We can only give here the following tabular view of the treatment recommended by Dr. Peaslee for the two forms of the disease, as drawn up by himself:—

INDICATIONS.	STHENIC LARYNGO-TRACHEITIS.	ASTHENIC LARYNGO-TRACHEITIS.
I. To arrest the inflammatory process, and control the laryngismus.	An emetic, followed by a full dose of calomel, if required.	Do. do.; or pill. hydrargyri, instead of calomel.
	Leeches to the throat, or over the sternum; followed by cold applied continuously.	Leeches doubtful. Cold continuously applied.
	Tartrate of antimony; sedative doses, cautiously administered.	Nitrate of potassa.
	Internal application of solution of nitrate of silver.	Do. do.
	Inhalation of aqueous and narcotic vapours.	Do. do.
	Opiates, with caution. Hydrocyanic acid, do. do.	Do. do.
II. To prevent organization of the exuded plasma.	Sponge-probang and caustic solution.	Do. do.
	Expectorants.	Stimulating expectorants.
	Calomel, in small doses.	Turpeth minerul.
	Alkalies.	Do. do.
	Counter-irritation.	Do. do.
	Tracheotomy?	
III. For removing the false membrane whenformed.	Continue caustic solution.	Do. do.
	Do. expectorants.	Do. do.
	Do. counter-irritation.	Do. do.
	Do. alkalies.	Stimulant alkalies.
	No emetics, or calomel.	Do. do.
	Tracheotomy, *seasonably*, if at all.	Do. do.
IV. To sustain the strength.	Milk-porridge, arrowroot, broth, &c.	Do. do.; also wine whey, milk punch, &c.
	Tonics, if required.	Tonics and stimulants.

The entire monograph we would very strongly recommend to the attention of the medical public as being among the very best that have appeared in reference to the disease of which it treats.

D. F. C.

ART. XIX.—*A Practical Treatise on the Diseases Peculiar to Women, Illustrated by cases derived from Hospital and Private Practice.* By SAMUEL ASHWELL, M. D., Member of the Royal College of Physicians, London; and late Obstetric Physician and Lecturer to Guy's Hospital. Third American, from the Third and Revised London Edition. 8vo. pp. 528. Philadelphia, 1855. Blanchard and Lea.

THE treatise of Dr. Ashwell has been already assigned a high rank among the leading authorities on the diseases of the female; and deservedly so. Although less full and comprehensive than one or two of the modern works on the subject by distinguished Continental writers—it being confined mainly to a consideration of the affections incident to the non-pregnant state—nevertheless, the clear, definite, common sense, and practical manner in which the subjects embraced in it are treated—more weight being accorded to the results of positive and repeated observations than to the deductions from specious hypotheses, and to *a priori* reasonings in favour of any special system of medi-